

STACK
ANNEX

5

062

107

Toledo

A

0000857300



UC SOUTHERN REGIONAL LIBRARY FACILITY

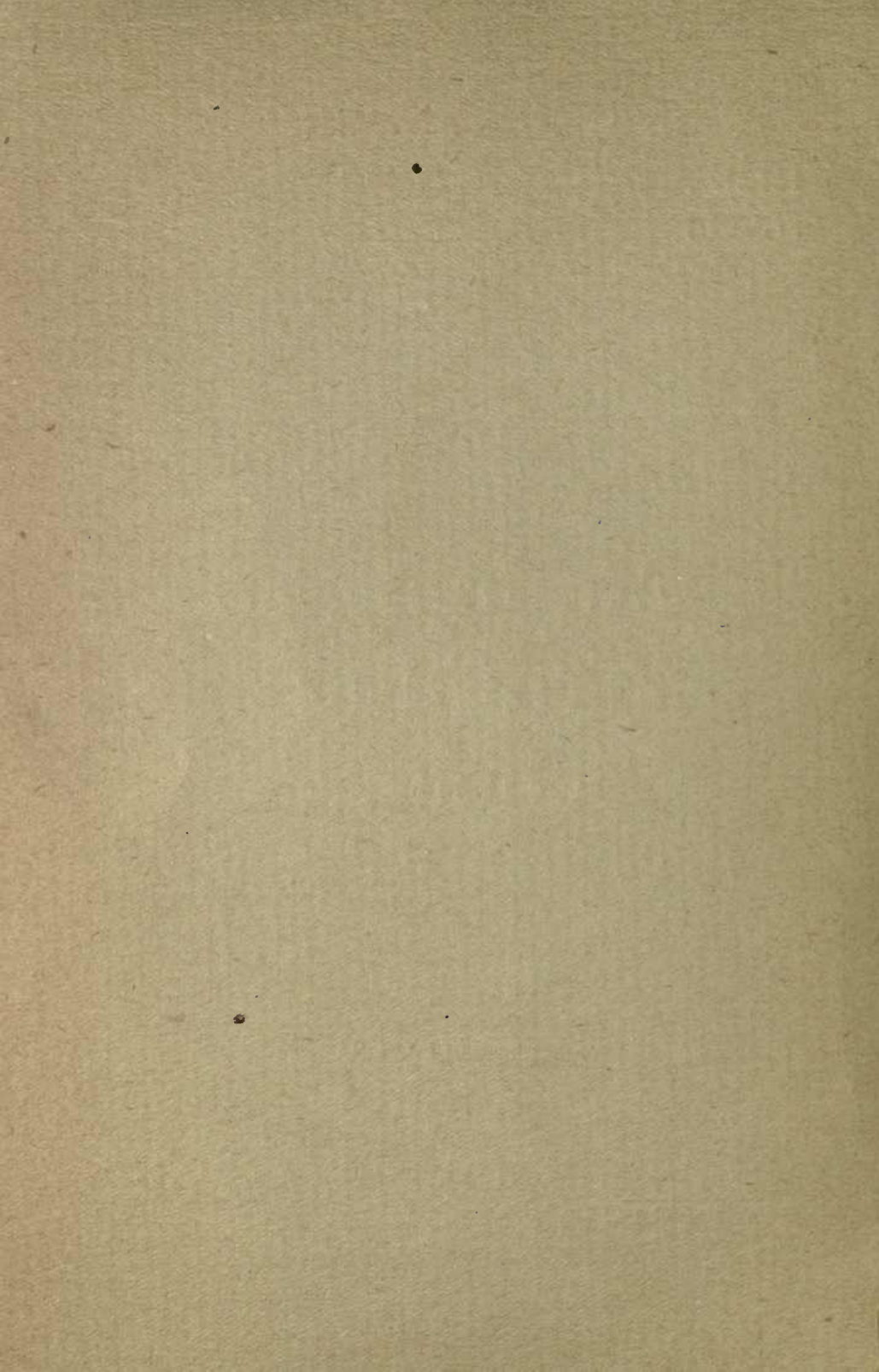
Manual... Training School...

(WORLD'S FAIR EDITION.)

1893.

The B. F. Wade Co., Printers.

(P)



THE
TOLEDO
Manual Training School.

1893.

2066705

If we abridge, in some cases, the hours given to books and the time wasted in idleness, and introduce exercises of a widely different character, the result is a positive intellectual gain. There is plenty of time if you will but use it aright. The students of a well conducted manual training school are intellectually as active and vigorous as in any high school. Nay, more, I claim, and I have had good opportunity to observe the facts, that even on the intellectual side the manual training boy has a decided advantage. I have been in charge of both kinds of schools, and know whereof I speak. The education of the hand is a means of more completely and efficaciously educating the brain. A manual training school does not stop with the training of the hand. Physical dexterity is but one, and the very least, of the many things sought, and this is sought more as a means than as an end. The great end is education; the development of the mind and body, the simultaneous culture of the intellectual, physical and moral faculties. WE BELIEVE IN THE STUDY OF THINGS FIRST, THEIR SYMBOLS SECOND.—*Dr. C. M. Woodward, Director of the St. Louis Manual Training School.*

It is an egregious mistake to suppose that those who favor manual training wish it to take the place of mental training, or are seeking to deprive any class of pupils of the portion of intellectual culture they now receive. But I would like to know why the hand should not be trained as well as the head? The perfectly educated man is he whose facile hand follows obediently the clear and ready promptings of a well-developed brain. The hand is the most marvelous instrument in the world; it is the necessary complement of the mind in dealing with matter in all its varied forms. It is the hand that "rounded St. Peter's dome;" it is the hand that carved those statues in marble and bronze; that painted those pictures in palace and church, which we travel into distant lands to admire; it is the hand that builds the ships which sail the sea, laden with the commerce of the world; it is the hand that constructs the machinery which moves the busy industries of this age of steam; it is the hand that enables the mind to realize in

a thousand ways its highest imaginings, its profoundest reasonings and its most practical inventions. One reason why there is so much unrest among the working classes is, that our public education does not give them all the help they need to enable them to pursue their work successfully and happily.—*Dr. James MacAlister, President Drexel Art Institute, Philadelphia.*

If we ask a boy to take his place at a carpenter's bench, it is not that we wish to make a carpenter of him, but that we wish to make him more of a man. We know that there is only one chance in fifty that he will use the saw, the chisel, the plane, the hammer, as the tools by which he earns his bread; but if he has had proper training in their use, he will carry to his work in life, whatever it may be, not only a better hand and a better eye, but also a better mind, a mind more perfectly filled and rounded out on all sides.—*Francis A. Walker.*

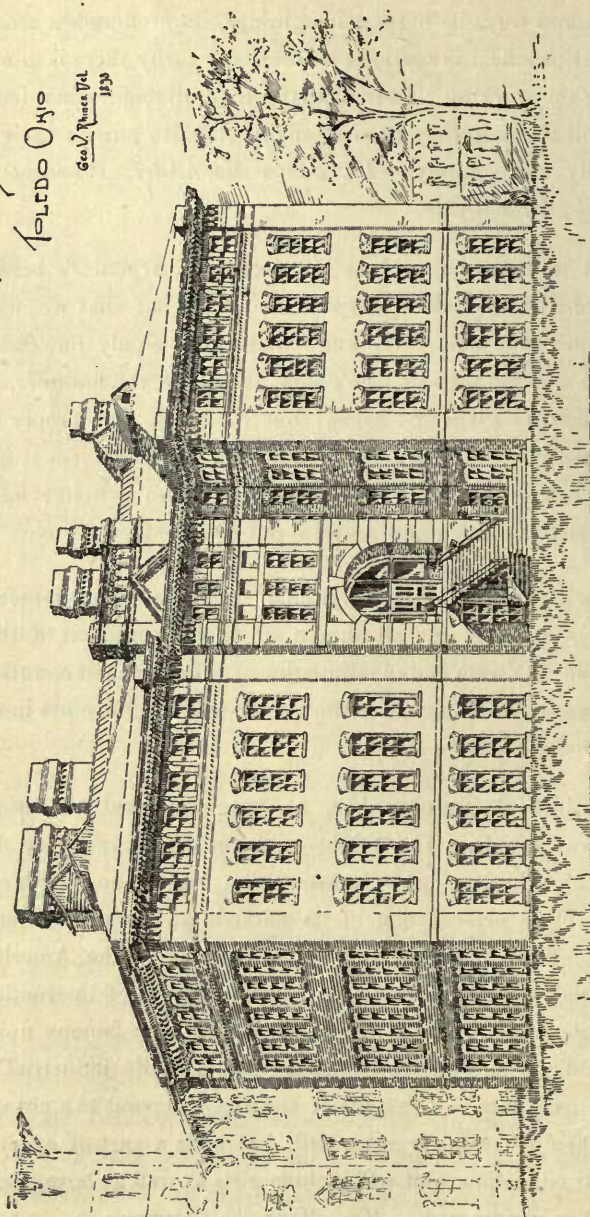
In a very deep sense all human science is but the increment of the power of the eye, and all human art is the increment of the power of the hand. Vision and manipulation,—these, in their countless indirect and transfigured forms, are the two co-operating factors in all intellectual progress.—*John Fiske.*

Industrial training has, at last, captured the heart of the American people. The public sentiment has become very strong in its favor, and the intelligent masses listen eagerly and with enthusiasm, to any clear presentation of its methods and practical details. In a portion of the public schools of twenty-five of the American States, industrial training is ingrafted on the course of instruction. Forty educational institutions, ranging from the most famous universities to the public schools of insignificant cities, include industrial training in their curriculum. The signs of the times all point to a not very remote era, when technical training will be made a part of every system of popular education, and will include girls as well as boys, young women as well as young men.—*Mrs. Mary A. Livermore.*

MANUAL TRAINING SCHOOL

TOLEDO OHIO

Geo V. Pierce Del.
1898



DRAWING MADE BY STUDENT.

THE
Toledo Manual Training School

IS MAINTAINED UNDER THE JOINT CONTROL OF THE

TOLEDO BOARD OF EDUCATION

AND THE

DIRECTORS OF THE TOLEDO UNIVERSITY.

TOLEDO BOARD OF EDUCATION :

SAMUEL KOHN, PRESIDENT.

CHARLES ZIRWAS,	GEORGE SCHUCK.
HOMER HOOD,	C. RUDOLPH BRAND,
JOSEPH B. BATTELLE,	HENRY J. CRANE,
WILLIAM J. REYNOLDS,	WILLIAM M. BELLMAN,

DIRECTORS OF TOLEDO UNIVERSITY :

WILLIAM H. SCOTT, PRESIDENT.

FRANK J. SCOTT,	ALBERT E. MACOMBER,
MICHAEL J. COONEY,	DR. SAMUEL F. FORBES,
ISAAC N. HUNTSBERGER,	DANIEL C. SHAW,
HENRY J. COLBURN.	WILLIAM G. HAGGENBERG,
HON. GUIDO MARX,	THEODORE J. BROWN,
DANIEL J. O'HARA,	HON. GUY MAJOR, MAYOR.

OFFICERS AND TEACHERS.

HIGH SCHOOL DEPARTMENT.

HARVEY W. COMPTON,

Superintendent Public Schools.

HENRY C. ADAMS,

Principal and Teacher in Latin and Psychology.

FREDERICK W. MATHIAS,

Civics and Physiology.

ARTHUR W. STUART,

Geometry and Algebra.

J. LEE RICHMOND,

Chemistry and Latin.

HERBERT G. SHAW,

Physics.

GOTTLOB F. LOK,

Principal German Department.

MARY DUNLAP,

English Literature.

ELSIE KRUEGER,

Algebra.

FANNIE HARNIT,

History.

FLORENCE TYLER,

English.

ALLEGONDA FOCKENS,

*Supervisor of Instruction in Free Hand Drawing,
Form and Color.*

MARY E. SMITH,

French.

LOUIS FISHER,

Assistant in German.

ELLA TORDT,

Assistant in German.

MANUAL TRAINING DEPARTMENT.

GEORGE S. WAITE,

*Superintendent of Manual Training School, and
Instructor in Wood Turning, Carving and
Forging.*

WILLIAM C. VANDEGRIFT,

Instructor in Mechanical Drawing and Carpentry.

CHARLES G. WENZEL,

*Instructor in Mechanical Drawing and Machine
Work.*

GEORGE L. COLBURN,

*Assistant Instructor in Mechanical Drawing and
Machine Work.*

ALLEGONDA FOCKENS,

*Supervisor of Sewing Department, and Instructor in
Garment Cutting and Making.*

MATILDA G. CAMPBELL,

Instructor in Cooking.

DORA MARX,

Instructor in Free Hand Drawing.

IDA RAINEY,

Instructor in Stenography and Type Writing.

OLIVE PARMELEE,

Assistant Instructor in Sewing.

GRAMMAR SCHOOL DEPARTMENT.

CLIFFORD G. BALLOU, *Principal.*

EMMA TAYLOR, ALICE MILLER, PAULA MERY.

TOLEDO MANUAL TRAINING SCHOOL.

Instruction in shopwork, free hand and mechanical drawing, is furnished by the University Board, while the intellectual studies, which must go hand in hand with the development of manual training, are furnished in the Public Schools, in the prescribed Grammar and High School courses.

The practical effect of the united action of these two Boards, is to so enlarge the scope of public instruction in Toledo, as represented by the Grammar and High Schools, as to include instruction in the practical arts, domestic economy, together with free-hand and mechanical drawing. The course, including this instruction, is known as the Manual Training School Course.

THE ORIGIN AND PURPOSE OF THE SCHOOL.

The object of the Manual Training School is to furnish instruction and practice in the use of tools, with such instruction as may be deemed necessary in mathematics, drawing, and the English branches of a high school course. The tool instruction includes carpentry, wood turning, pattern making, iron chipping and filing, forge work, brazing and soldering, the use of machine shop tools, and such other instruction of a similar character as may be deemed advisable to add to the foregoing from time to time.

The Manual Training School clearly recognizes the pre-eminent value and necessity of intellectual development and discipline. This school exacts close and thoughtful study with books as well as with tools. By lengthening the usual school day a full hour, time is found for drawing, tool work, and domestic economy, and a more liberal, intellectual and physical development—a more symmetrical education is secured.

Experience has shown that, to all students, without regard to plans for the future, the value of the training which can be obtained in shop work, spending only eight or ten hours per week, is abundantly sufficient to justify the expense of materials, tools and teachers.

THE DEVELOPMENT OF NATURAL APTITUDES.

It occasionally happens that students who have special aptitudes in certain directions, find great difficulty in mastering subjects in other directions. In such cases it is often the best course to yield to natural tastes, and to assist the student in finding his proper sphere of work and study. A decided aptitude for handicraft is not unfrequently coupled with a strong aversion to and unfitness for abstract and theoretical investigations. There can be no doubt that, in such cases, more time should be spent in the shop, and less in the recitation and lecture room. On the other hand, great facility in the acquisition and use of language is often accompanied by a great lack of either mechanical interest or power. When such a bias is discovered, the pupil should unquestionably be sent to the grammar and dictionary rather than to the laboratory or draughting room. It is confidently believed that the developments of this school will prevent those serious errors in the choice of a vocation which often prove so fatal to the fondest hopes.

ONE GREAT OBJECT OF THE SCHOOL IS TO FOSTER A HIGHER APPRECIATION OF THE VALUE AND DIGNITY OF INTELLIGENT MANUAL LABOR. A BOY WHO SEES NOTHING IN MANUAL LABOR BUT DULL BRUTE FORCE, DESPISES BOTH THE LABOR AND THE LABORER. WITH THE ACQUISITION OF SKILL IN HIMSELF, COMES THE WILLINGNESS TO RECOGNIZE SKILL IN HIS FELLOWS. WHEN ONCE HE APPRECIATES SKILL IN HANDICRAFT, HE HONORS THE WORKMAN.

In the Manual Training School, tool work never descends into drudgery, the tasks are not long, nor are they unnecessarily repeated. Whatever may be the social standing or influence of the parents, the

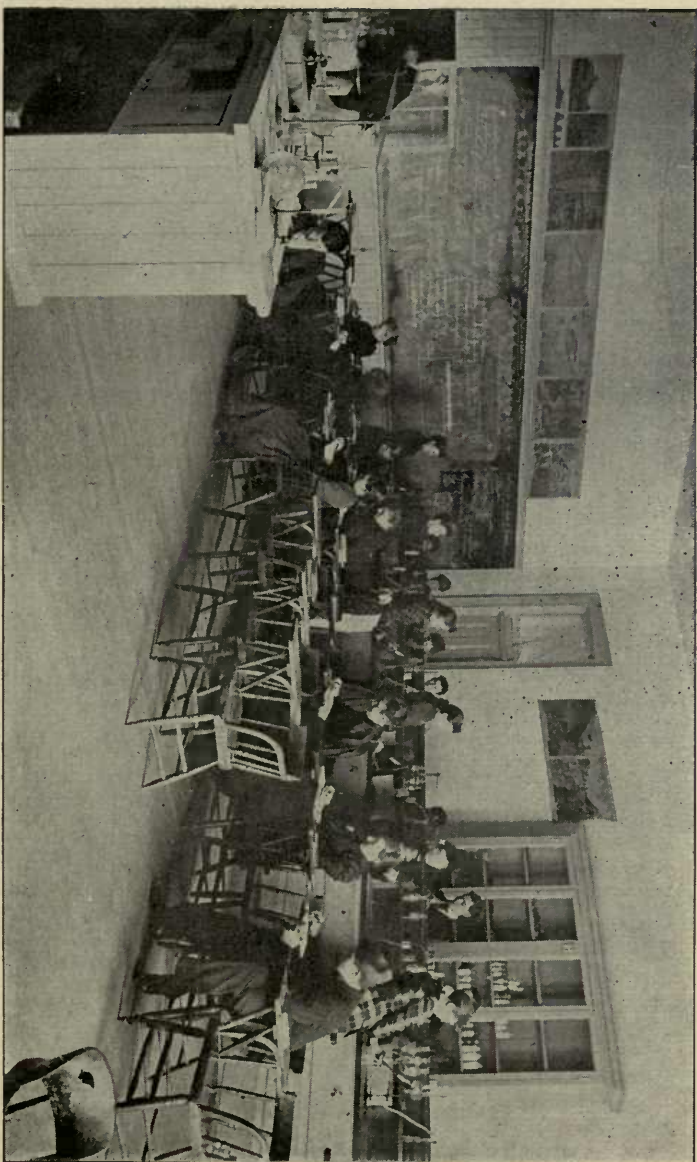
children go together to the same work, and are tested physically as well as intellectually, by the same standards. The result will be a truer estimate of industrial occupations, and a sounder judgment on all social problems.

It is not assumed that every boy who enters this school is to be a mechanic. Some will find that they have no taste for manual arts, and will turn into other paths—law, medicine, or literature. Some who develop both natural skill and strong intellectual powers will push on to a Polytechnic School into the higher realms of professional life, as engineers or scientists. Others will find their greatest usefulness as well as highest happiness in some branch of mechanical work into which they will readily step when they leave school. All will gain intellectually by their experience in contact with *things*. The grand result will be an increasing interest in manufacturing pursuits, more intelligent mechanics, more successful manufacturers, better lawyers, more skillful physicians, more useful citizens.

SPECIAL TRADES ARE NOT TAUGHT.

All the shop work is disciplinary ; special trades will not be taught, nor will articles be manufactured for sale. "It is the trained mind and hand that is put upon the market."

The scope of a single trade is too narrow for educational purposes. Manual education should be as broad and liberal as intellectual. A shop which manufactures for the market, and expects a revenue from the sale of its products, is necessarily confined to salable work, and a systematic and progressive series of lessons is impossible, except at great cost. If the object of the shop is education, a student should be allowed to discontinue any task or process the moment he has learned to do it well. If the shop were intended to make money, the students would be kept at work on what they could do best, at the expense of breadth and versatility.



IN THE CHEMICAL LABORATORY.

In manual education, the desired end is the acquirement of skill in the use of tools and materials, and not the production of specific articles; hence we abstract all the mechanical processes and manual arts and typical tools of the trades and occupations of men, arrange a systematic course of instruction in the same, and then incorporate it in our system of education. Thus, without teaching any one trade, we teach the essential mechanical principles of all.

THE COMBINED COURSE OF INSTRUCTION

Covers four years, and the school time of the pupil is about equally divided between mental and manual exercises. One hour per day is given to drawing, and two hours to shop-work.

The course of study will embrace five parallel lines—three intellectual and two manual, as follows:

First—A course of pure Mathematics, including Arithmetic, Algebra, Geometry and Plain Trigonometry.

Second—A course in Science and Applied Mathematics, including Physical Geography, Natural Philosophy, Chemistry, Mechanics, Mensuration and Book-keeping.

Third—A course in Language and Literature, including English Grammar, Spelling, Composition, Literature, History, and the elements of Political Science and Economy.

Fourth—A course in Penmanship, Free-hand and Mechanical Drawing, Stenography and Type-Writing.

Fifth—(1.) A course of Tool instruction, including Carpentry, Wood Turning, Forging, Soldering, and Bench and Machine Work in Iron. (2.) Instruction in Domestic Economy, including Cookery, Garment Cutting and Making, Clay Modeling, Wood Carving, etc.

Students have no option or election as to particular studies; each must conform to the course as laid down, and take every branch in its order.

The arrangement of studies and shop-work by years is substantially as follows, subject to such changes as experience may dictate:

COURSE OF COMBINED STUDY AND TRAINING FOR BOYS.

FIRST YEAR.

- | | | | |
|------|---|---|-------------------------------|
| (1.) | <i>Mathematics.</i> —Arithmetic. | } | Senior
Grammar
School. |
| (2.) | <i>Science.</i> —Physical Geography. | | |
| (3.) | <i>Language.</i> —Grammar, Spelling, Writing, English composition. | | |
| (4.) | <i>Drawing.</i> —Free Hand and Mechanical, Lettering. | } | Manual
Training
School. |
| (5.) | <i>Shopwork.</i> —Carpentry, Joining, Jig Sawing, Proper care and use of tools. | | |

SECOND YEAR.

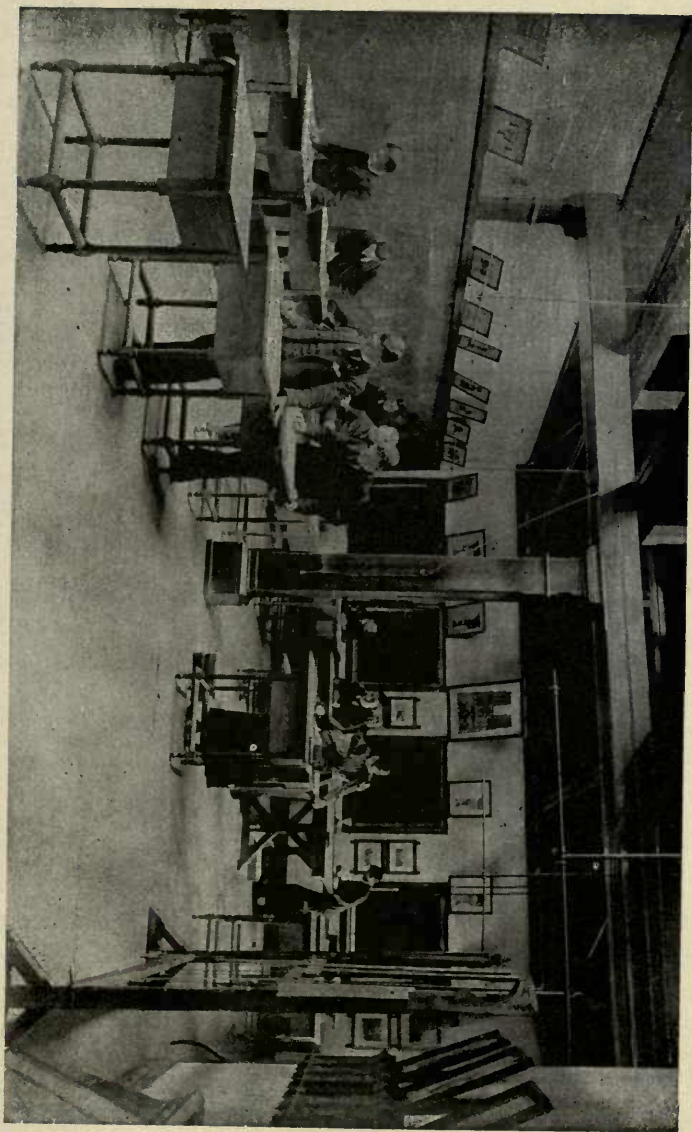
- | | | | |
|------|---|---|-------------------------------|
| (1.) | <i>Mathematics.</i> —Algebra, Arithmetic. | } | Junior
High
School. |
| (2.) | <i>Science.</i> —Civil Government, Physiology and Hygiene. | | |
| (3.) | <i>Language.</i> —Grammar, Rhetoric, Writing. | | |
| (4.) | <i>Drawing.</i> —Free Hand and Mechanical. Designs for Wood Carving. | } | Manual
Training
School. |
| (5.) | <i>Shopwork.</i> —Wood Turning, Pattern Making, Moulding and Casting. | | |

THIRD YEAR.

- | | | | |
|------|---|---|-------------------------------|
| (1.) | <i>Mathematics.</i> —Geometry, Arithmetic Reviewed. | } | Middle
High
School. |
| (2.) | <i>Science.</i> —Physics. | | |
| (3.) | <i>Language.</i> —English, Composition, History. | | |
| (4.) | <i>Drawing.</i> —Free Hand and Architectural. | } | Manual
Training
School. |
| (5.) | <i>Shopwork.</i> —Wood Carving, Forging, Welding, Tempering, Brazing and Soldering. | | |

FOURTH YEAR.

- | | | | |
|------|--|---|-------------------------------|
| (1.) | <i>Mathematics.</i> —Plane Trigonometry, Mechanics. | } | Senior
High
School. |
| (2.) | <i>Science.</i> —Chemistry, Book-keeping, Psychology. | | |
| (3.) | <i>Language.</i> —Political Economy, English Literature and Composition. | | |
| (4.) | <i>Drawing.</i> —Machine and Architectural Details, Decorative Designing. | } | Manual
Training
School. |
| (5.) | <i>Machine Shopwork.</i> —Clipping, Filing, Turning, Drilling, Planing, etc., Study of Machinery, Care of Steam Engine and Boilers, Study of Electrical Machinery and Testing Apparatus. | | |



A CLASS IN MECHANICAL DRAWING.

In the first year German may be taken in place of Physical Geography; in the second year in the place of Rhetoric or Physiology; in the third year in the place of History; in the fourth year in the place of English Literature.

Instruction in Mechanical Drawing will be somewhat abridged for pupils who may prefer a wider range in free-hand and decorative work.

Instructions will be given each year in the properties of the materials—wood, iron, brass, etc.—used that year.

Throughout the course, forty-five minutes per day will be given to drawing, and ninety minutes per day to shop-work. The remainder of the school day will be devoted to study and recitation. Each pupil must recite daily three lessons, which must mainly be learned at home. It is expected that the scholarship of the pupils shall be fully equal to the best high school standards. A diploma will be given on graduation, by the University Directors, in addition to the regular diploma for High School work.

Latin, French and German are optional studies.

The original purpose was to limit the Manual Training School course to three years and to make such period conform to the three High School years. Experience has shown, however, that manual instruction is equally valuable to boys of the Grammar School grade, and therefore the course has been arranged to include the senior Grammar School year. But the time required of such pupils in the work shops will be somewhat abridged.

Ambitious boys, who are sufficiently advanced to enter the High School, will be admitted to the work of the second year, provided they signify a purpose to complete the course and are willing to devote some extra time to laboratory work to cover the exercises of the first year.

DRAWING.

The course in Drawing embraces three general divisions:

1. *Free-Hand Drawing*, designed to educate the sense of form and proportion; to teach the eye to observe accurately, and to train

the hand to rapidly delineate the forms either of existing objects or of ideals in the mind.

2. *Mechanical Drawing*, including the use of instruments; geometric constructions; the arrangements of projections, elevations, plans and sections; also the various methods of producing shades and shadows with pen or brush.

3. *Technical Drawing or Draughting*, illustrating conventional colors and signs; systems of architectural or shop drawings; and at the same time familiarizing the pupil with the proportions and details of various classes of machines and structures.

And as at present arranged will comprise the following:

FIRST YEAR.—Principles of Projection Drawing; Free Hand Elevation, Plans and Sections of various objects; The use of drawing tools, including practice in pen lining, etc.; Working drawings to scale, including plans, elevations, sections and details of various machines and parts of machines; Lettering; Free hand perspective in outline from objects.

SECOND YEAR.—Geometrical Construction; Problems in oblique orthographic projection; Water coloring in flat washes; Development of surfaces as applied to sheet metal pattern work; Isometric projection; Free Hand perspective in light and shade from objects.

THIRD YEAR.—Pen line shading; Projection of shadows; Mechanical perspective; Architectural working drawings including plans, elevations, sections perspective and details of building and building construction; Free Hand drawing as applied to architectural ornamentation and enrichment.

FOURTH YEAR.—Water color shading; Machine design and construction; Machine drawing, including the laying out of trains of gearing, etc.; Geometrical ornamentation, and the elements of decorative art work; Free Hand drawing from casts; Pen sketching.

DETAILS OF SHOP INSTRUCTION.

The shop instruction is given similarly to laboratory lectures. The instructor at the bench, machinery, or anvil, executes in the presence of the whole class the day's lesson, giving all needed information, and at times using the blackboard. When necessary the pupils make notes and sketches (working drawings), and questions are asked and answered, that all obscurities may be removed. The class then proceeds

to the execution of the task, leaving the instructor to give additional help to such as need it. At a specified time the lesson ceases, and the work is brought in, commented on and marked. It is not necessary that the work assigned should be finished; the essential thing is that it should be well begun and carried on with resolute speed and accuracy.

THE SMALL AMOUNT OF SHOP PRACTICE.

The time spent in shop work has never exceeded one and a half hours per day, unless the boys have voluntarily remained after hours for additional practice. Moreover, from these two hours should be subtracted fully ten minutes for washing, dressing, etc. A week, therefore, represents less than eight hours of actual work in a shop. Hence, in placing a value upon the time spent, as men count time, it should be remembered that a "day's work" is all the boys have per week. For carpentry and wood turning they have three hundred hours, or thirty days in all; in forging, moulding, brazing and soldering, during the second year, three hundred hours. While this time is ample to furnish an intelligent idea of tools and their uses, of the laws of mechanism, of the properties of wood, iron, steel and brass, and the meaning and force of mechanical words and technical terms, yet it is not so great as to exhaust the boy physically, or to be incompatible with a high degree of proficiency in his purely intellectual studies.

The zeal and enthusiasm of the students have been developed to a most gratifying extent, extending into all the departments of work. The variety offered by the daily program has had the moral and intellectual effect expected, and an unusual degree of sober earnestness has been shown. The wholesome moral effect of a course of training which interests and stimulates the ardor of the student is most marked. Parents observe the beneficial influence of *occupation*. The suggestions of the day fill the mind with healthy thoughts and appetites during the leisure hours. Success in drawing or work shop has often had the effect of arousing the ambition in mathematics and history, and *vice versa*. Gradually the students acquire two most valuable habits which are certain to influence their whole lives, namely: precision and method.

The habit of working from drawings and to nice measurements has given the students a confidence in themselves altogether new. This is shown in the readiness with which they undertake the execution of small commissions in behalf of the school, and the handiness which they display at home.

From the testimony of parents, the physical, intellectual, and moral effect of the school is exceedingly satisfactory.

COURSE OF COMBINED STUDY AND TRAINING FOR GIRLS. DOMESTIC ECONOMY DEPARTMENT.

FIRST YEAR.

- | | |
|--|---------------------------|
| (1.) <i>Mathematics</i> .—Arithmetic. | |
| (2.) <i>Science</i> .—Physical Geography. | |
| (3.) <i>Language</i> .—Grammar, Spelling, Writing, English composition. | } Senior Grammar School. |
| (4.) <i>Drawing</i> .—Free Hand and Mechanical, Lettering. | |
| (5.) <i>Domestic Economy</i> .—Light Carpentry, Wood Carving, Care and use of tools. | } Manual Training School. |

SECOND YEAR.

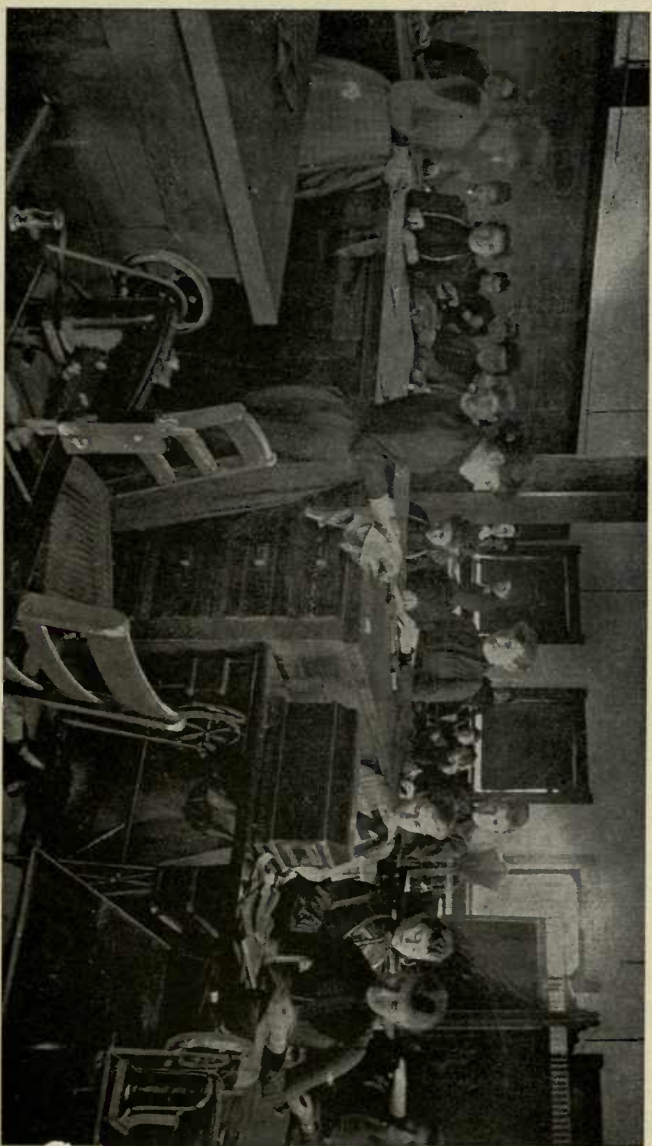
- | | |
|--|---------------------------|
| (1.) <i>Mathematics</i> .—Algebra, Arithmetic. | |
| (2.) <i>Science</i> .—Civil Government, Physiology and Hygiene. | |
| (3.) <i>Language</i> .—Grammar, Rhetoric, Writing. | } Junior High School. |
| (4.) <i>Drawing</i> .—Free Hand and Mechanical. Designs for Wood Carving. | |
| (5.) <i>Domestic Economy</i> .—Introduction to course in Cooking and Garment Cutting and Making. | } Manual Training School. |

THIRD YEAR.

- | | |
|--|---------------------------|
| (1.) <i>Mathematics</i> .—Geometry, Arithmetic Reviewed. | |
| (2.) <i>Science</i> .—Physics. | |
| (3.) <i>Language</i> .—English, Composition, History. | } Middle High School. |
| (4.) <i>Drawing</i> .—Free Hand and Architectural, Designing from Plant and Leaf Forms. | |
| (5.) <i>Domestic Economy</i> .—Instruction in preparing and cooking food, Purchasing household supplies, Chemistry of Cooking. | } Manual Training School. |

FOURTH YEAR.

- | | |
|---|---------------------------|
| (1.) <i>Mathematics</i> .—Plane Trigonometry, Mechanics. | |
| (2.) <i>Science</i> .—Chemistry, Book-keeping, Psychology. | |
| (3.) <i>Language</i> .—Political Economy, English Literature and Composition. | } Senior High School. |
| (4.) <i>Drawing</i> .—Machine and Architectural Details, Decorative Designing. | |
| (5.) <i>Domestic Economy</i> .—Cutting, Making and Fitting of Garments, Millinery, Household Decorations, Typewriting, Stenography. | } Manual Training School. |



A CLASS IN DRESS-MAKING.

The above course in Domestic Economy is arranged with special reference to giving young women such a liberal and practical education as will inspire them with a belief in the dignity and nobleness of an earnest womanhood, and incite them to a faithful performance of the every-day duties of life; it is based upon the assumption that a pleasant home is an essential element of broad culture, and one of surest safeguards of morality and virtue.

The design of this course is to furnish thorough instructions in applied housekeeping, and the sciences relating thereto, and students will receive practical drill in all branches of housework; in the purchase and care of family supplies, and in general household management; but will not be expected to perform more labor than is actually necessary for the desired instruction.

In cookery practical instructions will be given in the means employed in **BOILING**, **BROILING**, **BAKING**, **FRYING** and **MIXING**, as follows:

BOILING—Practical illustrations of boiling and steaming, and treatment of vegetables, meats, fish and cereals, soup-making, etc.

BROILING—Lessons and practice in: meat, chicken, fish, oysters, etc.

BREAD MAKING—Chemical and mechanical action of materials used. Manipulations in bread making in its various departments. Yeasts, and their substitutes.

BAKING—Heat in its action on different materials in the process of baking. Practical experiments in baking bread, pastry, puddings, cake, meats, fish, etc.

FRYING—Chemical and mechanical principles involved and illustrated in the frying of vegetables, meats, fish, oysters, etc.

MIXING—The art of making combinations, as in soups, salads, puddings, pies, cakes, sauces, dressings, flavorings, condiments, etc.

MARKETING AND ECONOMY, ETC.—The selection and purchase of household supplies. General instructions in systematizing and economizing household work and expenses. The anatomy of animals used as food, and how to choose and use the several parts. Lessons on

the qualities of water and steam; the construction of stoves and ranges; the properties of different fuels.

THE TEXTILE FABRIC WORK will cover instructions in garment cutting and making; the economical and tasteful use of materials; millinery, etc.

EXPENSES.

For the residents of Toledo instruction in the Manual Training School is free like the other schools; a small charge for material only being made as follows: The first year \$6; the second, third and fourth years \$6 to \$9 each; payable one-third at the beginning of the fall, winter and spring terms.

For non-residents of Toledo, tuition is payable as follows:

FIRST YEAR \$45. SECOND YEAR \$60. THIRD YEAR \$75. FOURTH YEAR \$90, payable as above.

Pupils must furnish their own drawing instruments, drawing boards, aprons and overalls. These cost about \$6.00 for the first year and about \$4.00 each, for the second, third and fourth years.

Board and lodging may be obtained within easy walk from the school for from \$4 to \$6 per week. The Superintendent will assist non-resident pupils in obtaining homes.

There is no opportunity in this school for a pupil to pay his way by his labor.

Pupils are expected to be earnest, faithful, truthful, and polite. Every one is expected to do his best, promptly and cheerfully, under all circumstances. The work of the school is supposed to stand first in importance, and parents should not allow trifles to interfere with it. Pupils who fail to make good progress in their work, after reasonable trial, will be required to withdraw.

Absences and irregularities of all kinds are reported to parents. Regular reports of the standing of pupils in each exercise of their class are made to parents every eight weeks.

Upon the recommendation of the Superintendent, graduates of the Manual Training School will be admitted without examination and

free of condition to the School of Mechanics and Engineering of Michigan University, Ann Arbor, Mich.; Sibley College, Cornell University, Ithaca, N. Y., School of Mechanics and Engineering, Ohio State University, Columbus, Ohio.

CONDITIONS OF ADMISSION.

Pupils of the Toledo Public Schools are entitled to enter the Manual Training Department when they reach the Senior Grammar or Junior High School grades.

Pupils of private or parochial schools are entitled to enter if they are qualified for, and pursue a course of study corresponding in grade to that taken by the regular pupils in the Senior Grammar and High School grades.

Youths who have the same qualifications, but who are not pupils of any school, may enter the classes provided they can pass the required examination, and maintain thereafter a satisfactory progress in the intellectual studies required of other pupils.

An examination of all pupils applying to enter the Manual Training course (except those who enter through the Grammar and High Schools), will be held in the room of the school building on the last Monday in June, 1893, beginning at 9 o'clock A. M. A second examination of applicants will be held at the same hour on the first Friday in September, 1893. Candidates are strongly advised to take the June examination to learn in what studies they may be deficient, so as to study during the summer months, and thus be prepared to pass at the September examination.

No pupils are admitted under thirteen years of age.

Applicants must pass a good examination in the following studies:

1st. In spelling, writing and punctuation, penmanship and the use of capitals, in Grammar to Syntax, and in correct forms of expression in writing.

2d. In Arithmetic to Equation of Payments; tables of weights and measures and their uses.

3d. Common school Geography.

4th. The History of the United States.

THE BUILDING

AND ITS FACILITIES FOR MANUAL INSTRUCTION.

A perspective view of the new building, which forms the East wing and Adams street front of the Toledo High School group, may be seen in the frontispiece. It is four full stories in height.

THE DRAWING ROOMS.

These occupy the fourth floor of the east half of the building, which is divided into two rooms, both admirably lighted by side and skylight, fitted with blackboards across the side, and with tables, drawing chairs, closets, and closet racks, so that all the pupils have each a place to put away the work engaged on, as class after class successively occupy the rooms. As drawing is the foundation for almost every species of correct mechanical work, students of the Manual School continue to work in these rooms from the beginning to the end of their school course. The rooms are warmed by steam and well ventilated.

THE DOMESTIC ECONOMY DEPARTMENT.

Opposite to the drawing rooms on the fourth floor, and occupying the whole of the west half of the building are the cooking class, and the textile fabric rooms, lighted in the same manner as the drawing rooms; warmed by steam, and perfectly ventilated.

THE COOKING ROOM.

This is 40x27 feet, with one large Garland Range, and two gas cooking stoves, five double tables 5 ft. long by 5 ft. wide, each table to accommodate four pupils; each with her own table space for work, and a small gas stove on the table between each two; the accommodations being for classes of twenty. Each table space has a drawer and cupboard below it for all essential utensils, and each pupil must personally go through every process taught. At the other end of the



A COOKING CLASS AT WORK.

room are pantry closets for teacher's use, and a commodious wash room with all conveniences for girls, including individual closets for each to keep aprons, clothes, etc.

THE TEXTILE FABRIC ROOM.

This is also 40x27 feet, in the north part of the building. The furniture and appliances for teaching domestic handiwork in the cutting and making of garments, upholstery, house furnishing, hand and machine sewing, etc.

THE WOOD-WORKING DEPARTMENT

Occupies two easterly rooms, one on the third and one below it on the second story, each 40x55 ft. The former contains twelve heavy double work benches, with full sets of tools for each pupil, including vises, grindstone, etc., and accommodates three classes of twenty-four students each, per day. The second floor room contains the same equipment as the third floor room, and in addition, one Rogers' jig saw, and 24 improved wood-turning lathes. The former room receives the pupils of the first year's course, and the latter the second year classes—those who have successfully gone through the first year's course. A complete equipment of belting and gearing, run by steam, moves all the saws and lathes in the wood-working rooms.

THE WOOD CARVING ROOM

Is 40x27 feet, has plenty of light, a very essential feature, and is equipped with twelve suitable benches, designed especially for wood carving. A very convenient form of vise, which holds the work down firmly on the bench, is in successful use. As in all other departments, each pupil has his own tools and drawer. The tools are necessarily kept well ground and sharpened, a fine grind stone being part of the equipment.

THE FORGING ROOM.

This occupies the whole of the ground floor on the east side and is a room 40x55, twelve feet high. The room is well lighted and is equipped with 18 forges and anvils with all needed tools for each, and benches, vises, grindstone, etc. A system of galvanized iron pipes

is over all the forges, and the forge blast is obtained by means of a power blower and large exhaust fan run by steam, ventilating into large chimneys. Work in this room begins the third year of the course.

THE MACHINERY ROOM.

This is main floor room on the west side of the hall and is equipped with the necessary machinery and appliances to teach the handling of iron working machines, and the handling of iron work.

THE MACHINE SHOP.

It is a room 40x55, twelve feet in height. It possesses an equipment of eight Putnam engine lathes, two speed lathes, two drill presses, a good sized planer, a shaper, an excellent Universal milling machine, an emery grinder and a grind stone. Vises of the most approved pattern are firmly fixed upon benches placed under the windows of the room. The shop can accommodate a class of fourteen.

ENGINE, BOILER, ETC.

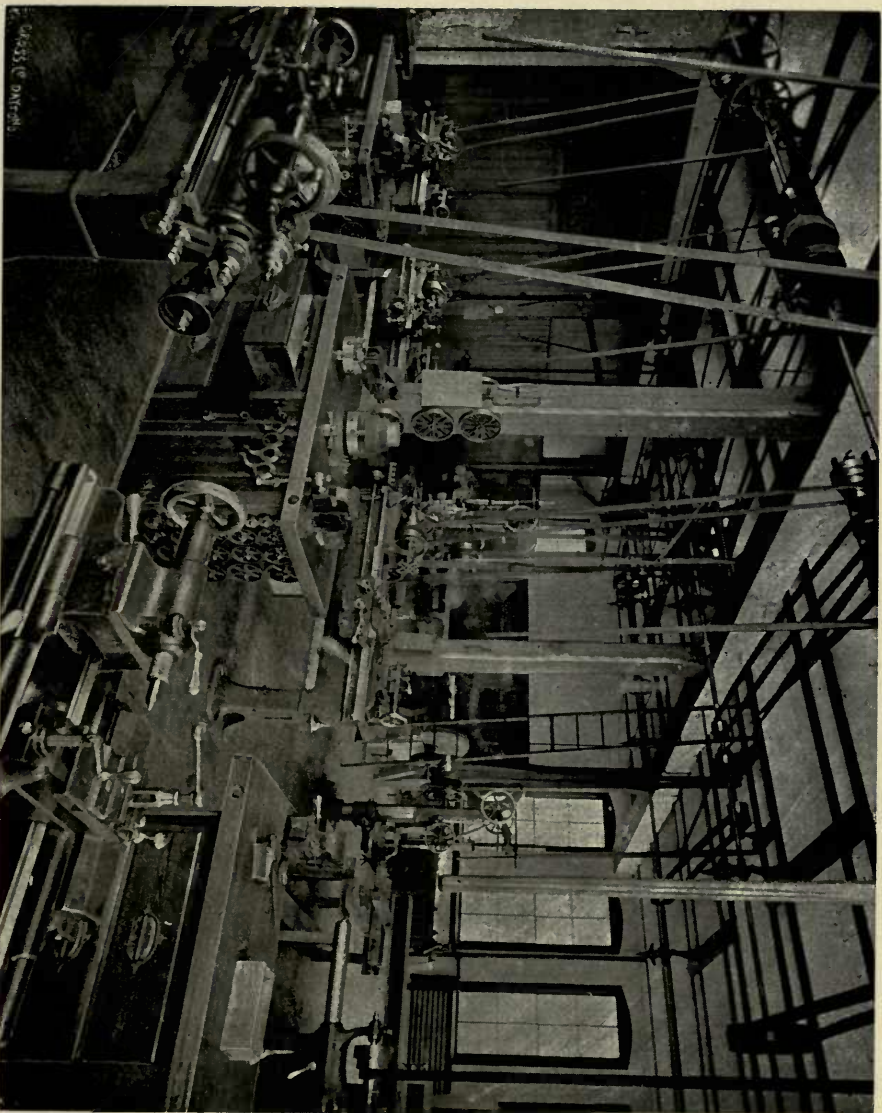
The boiler and coal room is under the sidewalk of Tenth street in a vaulted room perfectly adapted to the purpose. The boiler is a steam 70-horse power, steel tubular, and furnishes power to run the engine, and steam to heat the entire building. The engine occupies a place in the main hall on the ground floor, inclosed with a glass partition. It is a 50-horse power Ball Engine. Instruction is given the pupils in the use and care of the boiler and engine in all their details and these, as well as the force pump, feed water, heater, hot water receiver, and steam heating apparatus will all be used to illustrate the generation and application of steam.

OFFICE AND READING ROOM.

The office of the Superintendent is above the main hall. Above it is a room which has been provided with mechanical and architectural journals, both for the use of regular pupils, and for the night classes.

HOW THE USE OF TOOLS IS TAUGHT.

The tools of a shop are not given out all at once; they are issued as they are needed, and, as a rule, to all the members of the class alike.



MACHINE SHOP.

I. CARPENTRY.

In carpenter work the tools used are: The cross-cut-tenon, and rip saws; steel square, try square, bevel and gauge, hammer, mallet, rule and dividers, oil stones and slips. And among edge tools: The jack and smoothing planes, chisels and gouges. Braces and bits, jointer planes, compass saws, hatchets and other tools are kept in the shop tool-closet to be used as needed.

The saw and the plane with the square and gouge are the foundation tools, and to drill the pupils in their use numerous lessons are given, varied only enough to avoid monotony. The pupil being able to plane a piece fairly well, and to keep to the line in sawing, the first and most important step is to learn to "lay out" his piece properly. This requires great care, attention to details, and precision. Self-taught workmen are always lacking here. The next step is to teach him the use of the chisel in producing simple joints of various kinds. The particular shapes are given with the intent to familiarize the pupil with the customary styles and methods of construction.

Previous to the execution of a lesson in wood each pupil is required to make a working drawing of the same in his book, inserting all necessary dimensions in figures.

The different sizes of the same tool, a chisel for instance, require different care and methods of handling; and the means of overcoming irregularities and defects in material forms another chapter in the instruction to be given.

With the introduction of each tool the pupils are taught how to keep the same in order. They are taught that sharp tools are absolutely necessary to good work. They are also taught as their lesson progresses the character and strength and peculiarities of various woods and modes of using them to best advantage.

II. WOOD-TURNING.

Five or six tools only are used, and from previous experience the pupils know how to keep them in order. At first a large gouge only is issued, and the pupils are taught and drilled in its use in roughing out and producing cylinders and cones; then concave and double-

curved surfaces; then in work comprising all these—all in wood turning with the grain. A wide chisel follows, and its use in conjunction with the gouge is taught. After this a smaller gouge, chisel, and parting tool, and a round-point are given, and a variety of shapes are executed. Next comes turning across the grain; then bored and hollow work, chucking and the various ways of manipulating wood on face-plates, mandrels, etc. Finally, turning of fancy woods, polishing, jointing and pattern work.

In connection with the making of patterns, their use is shown by brief exercises in moulding.

III. WOOD-CARVING.

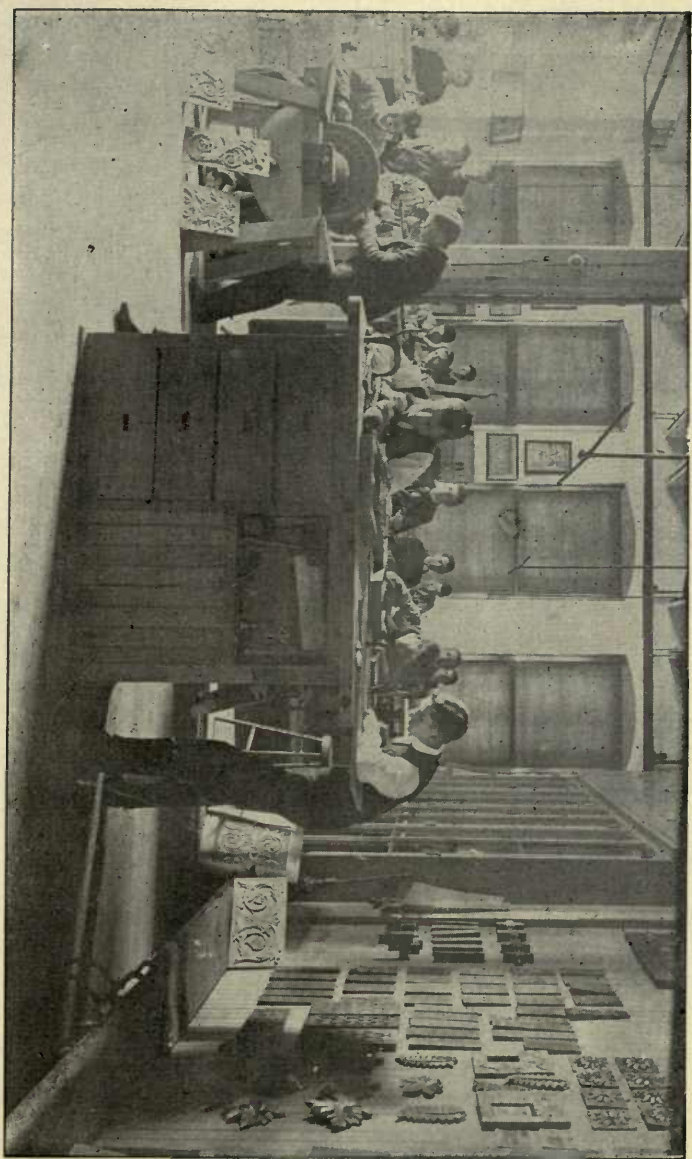
In wood-carving, ten or twelve tools are used. The smallest gouge is first taken up and straight and curved lines are cut, with and across the grain. The parting tool follows and reversed curves are cut first on flat and then upon convex surfaces. The straight and skew chisels and a larger gouge are then given out and their use taught in connection with the first tools, by cutting rosettes, vines, etc. After all the tools have been introduced, some practical carving is done requiring the use of all the tools.

The designs to be executed are drawn upon the paper and wood by the pupils themselves.

IV. FORGING.

Work in the blacksmith shop is in one essential feature different from any other kind. Wood or cold iron will wait any desired length of time while the pupil considers how he should work, but here comes a temperature subject to continual change. The injunction is imperative to "strike while the iron is hot," and hence quick work is demanded—a hard thing for new hands. To obviate this difficulty bars of lead are used, with which the lesson is first executed, while all the particulars of holding and striking are studied. The lead acts under the hammer very nearly like hot iron, and permits every operation on the anvil except welding.

The various operations of drawing, bending, upsetting, punching, welding, tempering, etc., are learned in connection with the fabrication



A WOOD CARVING CLASS AT WORK.

tion of hooks, stirrups, chains, swivels, tongs, hammers and machine tools.

The final exercise in the shop consists in the construction of a set of tools which the pupil will himself use in the machine shop during his fourth year.

One of the most difficult lessons in the art of the smith is that of managing the fire. The various kinds of heat are explained and illustrated, and habits of economy of both iron and fuel are inculcated.

V. BENCH AND MACHINE TOOL WORK IN METALS.

In the machine shop it is obviously out of the question to furnish a class of twenty pupils with a lathe, planer, drill, etc., *each*. The cost of such tools puts the matter beyond discussion.

Hence it is not possible to have all the pupils in a class of twenty performing the same exercises at the same time, as is the case in all the shops just described. Nevertheless, this fact does not interfere with the use of systematic lessons and uniform practice. By exercises suited to the uses of each machine, and to bench work, and by regular rotation of the class, each pupil does the same work. The verbal instruction and illustration at the machine for any lesson is given to the whole division at once, though several days may intervene between the giving of the instruction and the pupil's performance. Thus it is practicable to secure in a large degree the benefits of the class system.

The course includes work at the:—

(a.) *Bench*: Use of hammer and chisel, file and scraper, hand dies, taps and reamers.

(b.) *Hand-Lathe*: Use of hand tools, drilling, counter-sinking, filing and polishing.

(c.) *Engine-Lathe*: Turning, boring with bar and lathe tool, screw cutting, external and internal chucking and machine fitting.

(d.) *Drill-Press*: Drilling and boring.

(e.) *Planer and Shaper*: Producing flat or curved surfaces and fittings.

(f.) *Milling Machine*: Reamers, drills, cutters.

(g.) Care of tool room, the preparation of shop drawings; study of the engine and boilers.

(h.) Construction of some special machine by the class.

EVENING SCHOOL.

An evening department is also maintained under the joint control of the Board of Education and the Manual Training School Directors.

This school has been organized to meet the demand of a large number of young people whose occupations absorb the hours of the day, but who desire to devote a portion of their evenings to further study in elementary and technical subjects.

The school will open on the first Monday evening in October in each year and continue four evenings in each week for a term of six months.

The pupils must be at least fourteen years of age and be familiar with elementary arithmetic, and be able to write a fair hand.

The course of instruction will be graded to conform to the needs of the pupils and will be advanced from year to year as the classes make progress. Scientific and technical subjects will be illustrated by lectures, drawings and appropriate apparatus. Pupils are not required to take the full course but will be allowed to elect such topics as meet their tastes or have a direct bearing upon their occupations.

Thus far instruction in the evening classes has been confined to Mathematics, Physics and Drawing. It is now proposed to give the evening school a wider scope, and to cover the topics of the day schools so far as a demand for such instruction shall be made to appear, upon application of a sufficient number of pupils. No class will be organized until it shall be made to appear to the satisfaction of the Superintendent of Public Schools that not less than twenty pupils will give continuous attendance upon the course of instruction demanded. Upon such application and information classes will be organized and instruction given by lectures and otherwise upon the topics indicated upon the following page.

EVENING CLASSES.

TERM OF SIX MONTHS, BEGINNING FIRST MONDAY EVENING IN OCTOBER.

SUBJECTS OF STUDY.	EVENINGS.	HOURS.
ARITHMETIC—Elementary.....	Thursday.	7½ to 8½
Intermediate.....	Friday.	8½ to 9½
Advanced.....	Thursday.	8½ to 9½
ALGEBRA,.....	Friday.	7½ to 8½
AMERICAN HISTORY,.....	Monday.	7½ to 8½
BOOK KEEPING,.....	Tuesday.	7½ to 8½
BUILDING CONSTRUCTION,	Tuesday.	8½ to 9½
BOTANY,.....	Monday.	8½ to 9½
DRAWING—Free-Hand, Architectural, Mechan- ical, Ornamental.....	Monday and Tuesday.	7½ to 9½
DEBATING AND LITERARY SOCIETY.....	Tuesday.	8½ to 10
ENGLISH GRAMMAR,.....	Friday.	8½ to 9½
EXPERIMENTAL PHYSICS—Light, Heat, Sound, Electricity and Magnetism.....	Thursday.	8½ to 9½
ETHICS—Rights and Duties. The Laws of Right Conduct.....
GEOGRAPHY,.....	Thursday.	8½ to 9½
GEOLOGY,.....	Thursday.	7½ to 8½
GEOMETRY,.....	Friday.	7½ to 9½
GERMAN—Beginners, Elementary, Advanced...	Tuesday.	8½ to 9½
MACHINE CONSTRUCTION,.....	Monday.	8½ to 9½
MECHANICS, APPLIED—The Scientific Principles Relating to Mechanical Operations, Mechanism and Machinery.....	Monday.	7½ to 8½
MECHANICS—THEORETICAL, Statics, Dynamic, Hydrostatics and Pneumatics.....	Thursday.	8½ to 9½
PHYSIOLOGY,.....	Thursday.	7½ to 9½
PHYSICAL GEOGRAPHY,.....	Friday.	8½ to 9½
POLITICAL ECONOMY,.....	Friday.	7½ to 8½
SCIENCE OF GOVERNMENT—Civics, Constitu- tional History, etc.....	Friday.	8½ to 9½
WRITING AND READING,.....

The instruction in drawing will be of especial value to carpenters, joiners, wood-workers, masons, bricklayers, painters, plasterers, and will include the study of original designs as applied to manufacture of furniture, ornamental iron work, wall and ceiling decorations, etc.

Brief lectures will be given from time to time upon important topics, viz: Construction, practical geometrical problems; how to use the T. square, set square, and drawing instruments, bisecting of lines; how to draw and indicate center lines, radical lines and dimension lines, etc., line shading, brush shading, scale drawing, detail drawing; how to construct scales, how to proportion and draw hexagon and square nuts, projection of plain objects, construction of block letters, plain and oblique projection; how to indicate the section of different materials, free hand sketching, styles of architecture, the orders, details, perspective, sketching, scale drawing, sheet metal, pattern work, projection shading, perspective and prespective shading.

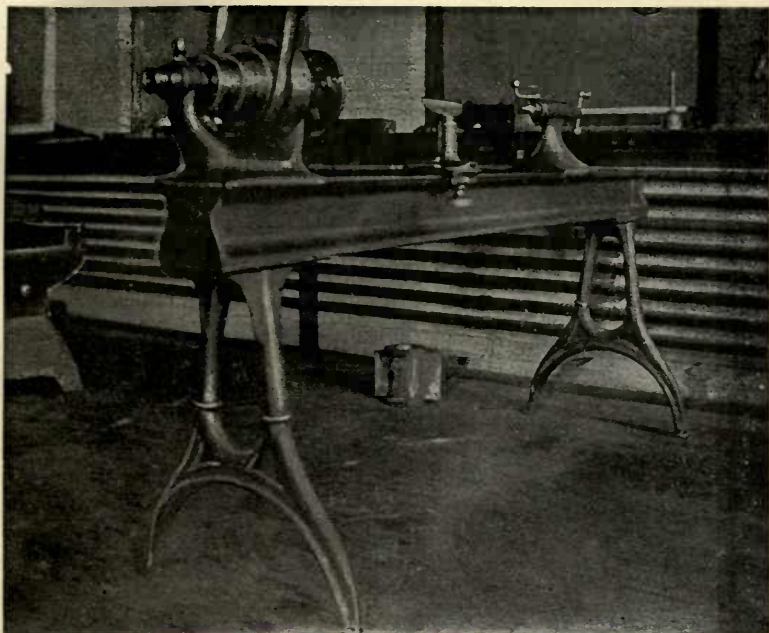
These lectures, accompanied by drawings and illustrations upon the blackboard, will impart instruction that will require years of experience in the work shop to supply.

EXPENSES.

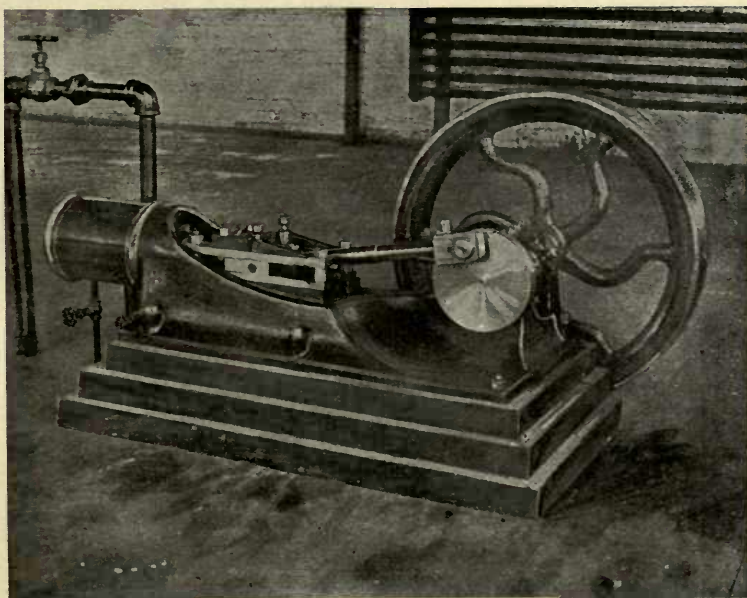
The evening school is practically free, but a nominal charge of \$3.00 to \$5.00 will be made to each pupil, payable in advance. Pupils must furnish their own drawing instruments and drawing material. The instruments and material required the first year will cost from \$3.00 to \$5.00.

Pupils who desire to avail themselves of the opportunity of this school but who hesitate to apply for lack of means for payment of fees or purchase of instruments, are informed that provision has been made for the payment of such charges, for a limited number of pupils, and the parents of such are invited to consult with the Superintendent.

For further information relating to the Toledo Manual Training School and the Evening Department, apply to George S. Waite, Superintendent, at the office of the Manual Training School.



ONE OF SEVERAL LATHES BUILT BY SENIOR CLASS.



ENGINE BUILT BY SENIOR CLASS.

LIBRARY OF THE UNIVERSITY OF MICHIGAN
A 000 085 730

